

GOVERNMENT OF INDIA  
METEOROLOGICAL DEPARTMENT

# INDIA WEATHER REVIEW, 1944

## ANNUAL SUMMARY

### PART B

## SNOWFALL

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# INDIA WEATHER REVIEW, 1944.

## ANNUAL SUMMARY.

### PART B.

#### SNOWFALL.

This part contains a summary of the reports of snowfall in the mountain regions to the north and north-west of India. These reports are collected by local officers from the local residents, headmen of villages or from travellers who have passed through the region, and are then transmitted to this office.

The amount of snowfall is usually measured by finding the depth of undisturbed snow lying on the ground. The measurements are given in feet and inches. At places provided with raingauges the snow collected in the gauge is melted and measured as rain; this is indicated in the text and the amounts are given in inches and cents.

#### Cold Weather Period, January and February.

##### I.—AFGHANISTAN.

*Kabul.*—Snow fell on the ground on seven days in January and on twelve days in February aggregating to depths of 13" and 19" respectively. The falls were reported to be below the average in both the months.

About 4" of snow accumulation remained on the ground at the end of January; the high peaks of the Paghman and Hindu Kush ranges and the Shibar peaks were thickly covered with snow, but the Shibar Pass was open to traffic. At the end of February, snow had cleared up from the ground in the valley, but the Hindu Kush range and the Paghman hills were well covered with snow.

##### II.—BALUCHISTAN.

*Quetta.*—Snow fell at the station once in each of the two months giving about 4 inches and 1½ ft. of snow respectively. Slight to moderate falls of snow were observed on the hills on three days in January and two days in February. The falls were reported to be much below the average. No information is available about accumulations at the end of the period.

##### III.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—Snowfall was reported on twelve days in January and on fifteen days in February. The falls during and the accumulations at the end of each month are given below.

Locality.	January.		February.	
	Falls.	Accumulations.	Falls.	Accumulations.
	Ft.	Ft.	Ft.	Ft.
alkote . . . . .	10	7	11½	6
Thandiani . . . . .	6½	5	7½	4
Birangali . . . . .	5	4	5	1½
Dungagali . . . . .	3½	2½	6½	5
Kalabagh . . . . .	3½	2	7	4½
Naranz . . . . .	2	2½	12	2
Pludran . . . . .	1½	2	10	1½
Kagan . . . . .	1	1	7½	½
Jared . . . . .	½	½	3½	½
Malkandi . . . . .	1	½	½	—

The falls were below normal in January and normal in February, whereas the accumulations were below normal in both the months.

(b) *Dir, Swat and Chitral—Drosh.*—Snow fell on five days in January at Drosh aggregating to a depth of about 10". On the Lowarai pass and the Madaglasht hills, the falls amounted to 3 ft. At the end of the month some accumulations were present on the surrounding passes and mountains. The falls and the accumulations were below normal. No report was received for February.

*Malakand.*—Snow fell at Chakdara on eight days in January and on four occasions in February, the total depths of falls being 18½ ft. and 6 ft. respectively in the two months. The falls were normal. The accumulations of snow on the surrounding higher peaks at the end of January were estimated to be :—

	Ft.
Lowarai . . . . .	20
Bashkar . . . . .	21
Mankial . . . . .	22
Ilan and Dwa Sarai . . . . .	13
Hindu Raj . . . . .	16

(c) *Khybar Agency.*—Snow fell on two days in January and on one day in February giving 1½ ft. and 1 ft. of snow respectively in the Tirah valleys. On the hills the falls were heavier.

(d) *Kohat.*—At Fort Lockhart, in the Samana range, snow fell on three days in January to a total depth of 21½ inches; in February snowfall amounted to 6½ inches. The falls were about normal.

(e) *North Waziristan.*—Snowfall was normal.

(f) *Dera Ismail Khan.*—Snowfall in the Takhat-i-Sulaiman was reported to be above the average but no exact data are available.

##### IV.—KASHMIR.

(a) *Skardu.*—Occasional light falls of snow occurred in both the months at the station. On the surrounding mountains and passes above 9,000 ft. snowstorms in the last week of January gave about 4 ft. of snow, while in February the depth of snowfall during each snowstorm is reported to have been about one foot. At the station proper, the accumulation of snow at the end of January was 5"; this had practically melted away by the end of February. On the surrounding higher passes the snow accumulation was reported to

be 5 to 6 ft. deep at the end of January and 8 to 9 ft. deep at the end of February. The falls and accumulations were generally normal for the period.

(b) *Dras*.—Snow fell on nine days in January and on sixteen days in February. The falls were normal in both the months. The accumulation of snow at Dras amounted to 17" at the end of January and 23" at the end of February. On the Mushkoo hill, the accumulations were reported to be 5 ft. at the end of January and 8 ft. at the end of February. All the hills were covered with snow, and the Zojilla pass was closed to traffic throughout the period.

(c) *Srinagar*.—Several light to moderate as well as some heavy falls of snow occurred on the surrounding mountains and light to moderate falls in the valleys during the period. Both falls and accumulations were generally above normal.

(d) *Kargil*.—Snow fell on five days in January and on ten days in February. The accumulations at the station were 6" and 9" respectively at the end of the two months, while on the surrounding high peaks they amounted to 3 ft. and 5 ft. Both falls and accumulations were about normal.

(e) *Sonamarg*.—There were thirteen snowfalls in January and seventeen in February. Snow covered all the mountains and peaks around. The snow, melted and measured as water, amounted to 11"·29 in January and 10"·43 in February. The falls were below normal in January and normal in February. The accumulations at Sonamarg at the end of the two months were 5 ft. and 8 ft. respectively while those on the Zojilla mountains were reported to be 8 ft. and 10 ft. The accumulations were below normal.

(f) *Leh*.—There were several snowstorms of varying intensity in January and a few mild ones in February. The snowline descended to 11,000 ft. in January. The accumulations on the high passes were about 4 ft. at the end of both the months. The falls were below normal and the accumulations about normal.

#### V.—THE PUNJAB.

(a) *Rawalpindi*.—Snow fell on seven days in January and on six days in February aggregating to depths of 3½ ft. and 10" respectively. The falls were below normal and there was no appreciable descent of the snowline.

(b) *Chamba, Tissa Range*.—Snow fell on ten days in January and on sixteen days in February; the snowline descended to 4,000 ft. on one occasion in January but remained at 7,500 ft. in February. The falls were less than normal below 7,000 ft. and above normal at higher elevations. Most of the well-known passes were closed to traffic. The following table gives the falls at certain stations for the two months.

Locality.	January.	February.
	Ft.	Ft.
Tissa (4,500 ft.) . . . . .	1½	—
Alwaa . . . . .	—	12½
Chhatil (7,500 ft.) . . . . .	5½	1½
Khangu (8,000 ft.) . . . . .	6	6

*Bhandal Range*.—There were eight snowstorms in January and five in February giving 5½ ft. of snow in January and 2 ft. in February. The snowline descended to 6,000 ft. in both the months. All the higher passes were thickly

covered with snow but no information is available about the actual depth of accumulations. The falls were about normal.

*Chamba Range*.—Four snowstorms occurred in January, the snowline descending to 3,000 ft. The total amount of snowfall at Kundi (6,000 ft.) was estimated to be 2½ ft. All the well-known passes and peaks were covered with snow. The falls in January are reported to have been below the average. No information is available for the month of February.

*Pangi Range*.—There is no information for January. In February there were thirteen snowfalls, amounting to a total of 4 ft. and the snowline descended to 5,000 ft. There is no information regarding accumulations.

(c) *Kulu (Kangra District)*.—The snowfalls on the high ranges of the Himalayan mountains in the Kangra and Palampur tahsils and the Kulu sub-division are reported to be about normal in January and less than normal in February (about 3 ft.) The snowline on the neighbouring ranges descended to 6,000 ft. and 8,000 ft. respectively in the two months. The estimated depths of accumulations at the end of each month are given in the following table.

Locality.	January.	February.
	Ft.	Ft.
Awarn pass . . . . .	8	7
Sawal pass . . . . .	8	6
Sangaru pass . . . . .	7	5
Hampta pass . . . . .	12	10
Rohtang pass . . . . .	11	9
Bhabu pass . . . . .	8	6
Bishleu pass . . . . .	7	5
Jalori pass . . . . .	8	6

*Kilba Hills (Simla District)*.—There were a few falls of snow in January, the heaviest occurring on the 22nd. Snow fell on eleven days in February, the heaviest being on the 17th. The snowline descended to 6,000 ft. in each of the months. The falls were reported to be below normal at the lower elevations, but were apparently above normal in February on the well-known higher peaks and passes which were closed to traffic. The accumulations in these regions were 8 ft. in January and about 20 ft. in February.

#### VI.—THE UNITED PROVINCES.

(a) *Almora*.—The following table gives the reported falls and the estimated accumulations in each of the months.

Locality.	January.	February.
	Ft.	Ft.
<i>Falls</i>		
Malla Danpur . . . . .	8	10
Malla Darma . . . . .	4½	4½
Chaudans . . . . .	17½	16
Byane . . . . .	—	11
Malla Johar . . . . .	—	—
<i>Accumulations.</i>		
Pindar Valley . . . . .	45	46
Nandakhat . . . . .	45	45
Sundar Dhunga . . . . .	40	40
Bankatia . . . . .	60	60
Masuring . . . . .	20	30
Lipu . . . . .	21	18
Lampia . . . . .	24	24
Nuwe . . . . .	24	25

The falls and accumulations were generally above the average.

*Garhwal.*—There were six falls of snow in January and ten in February, the total amounts being  $1\frac{1}{2}$ " to 7' in January and  $\frac{1}{4}$ " to 8' in February according to altitude. The snow-line descended to 5,000 ft. in both the months. The falls were generally normal.

*Mukteswar.*—No information is available for January. There were two falls of snow in February to a total depth of 6".

#### VII.—ASSAM.

(a) *Kamrup.*—There was no snowfall within the district

### Hot Weather Period, March to May.

#### I.—AFGHANISTAN.

*Kabul.*—There was no snowfall in the Kabul valley after the 6th March, but on the Paghman and the Hindukush hills, snowfall was noticed on the 17th May. At the end of May, the Shibar pass was clear of snow, and the accumulations on the Paghman and the Hindukush ranges were confined to the top and the crevices.

#### II.—BALUCHISTAN.

*Quetta.*—There was a light snowfall on all the important peaks on the 25th March. Even from the highest peaks, snow disappeared completely by the middle of April.

#### III.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—There was snowfall on eight days in March. The following table gives the total amounts of snowfall and accumulations at the end of March, both of which were below normal.

Locality.	Falls.		Accumulations.	
	Ft.	ins.	Ft.	ins.
Phalkot . . . . .	4	9	5	0
Thandiani . . . . .	2	8	2	6
Birangali . . . . .	0	8	0	6
Dungagali . . . . .	1	9	1	4
Kalabagh . . . . .	1	11	1	0
Narang . . . . .	0	6	0	6
Pludran . . . . .	0	4	0	4
Kagan . . . . .	0	2	0	2
Jared . . . . .	—	—	—	—
Sundagali . . . . .	—	—	—	—
Jachha . . . . .	—	—	—	—

The accumulations on the highest mountain ranges at the end of May were slightly above normal.

(b) *Dir, Swat and Chitral—Drosh.*—The falls and accumulations were reported to be below normal.

*Malakand.*—Snow fell on four days in March, and the accumulations at the end of the month on the well-known peaks were reported to be—Lowarai 27 ft., Bashkar 41 ft., Mankiyal 42 ft., Ilam and Dosara 30 ft. and Hindu Raj 34 ft. No report was received for April. No snow fell during May and the accumulations on the well-known peaks and passes at the end of the month were reported to be below normal.

and the passes to Bhutan were open.

(b) *Balipara Frontier Tract.*—Snow fell throughout most of January and February, the heaviest falls occurring in the latter part of February. The falls amounted to 3 to 4 ft. in the lower hills and 6 to 8 ft. in the upper hills. The falls were above normal throughout. The paths across the Se La and Me La were closed in the latter part of February.

*Sadiya Frontier Tract.*—Snow fell only on some mountain peaks opposite the Theroliang camp, and the snowline descended to 4,600 ft. The falls were below the average on the lower peaks and above normal on the higher peaks.

(c) *Khyber Agency.*—Snowfall occurred in the valleys and on the hills of Tirah during March, and was reported to be above normal. On the Morga hill, the accumulations at the end of March were about 5 ft. There was light snowfall on the hills adjoining Landi Kotal in March.

(d) *Kurram.*—No reports were received for March and April. The accumulations at the end of May on the well-known peaks and passes were—Sikaram Peak 5", Badin Peak 4" and Zeran and Sikaram passes 1".

(e) *Kohat.*—Fort Lockhart had no snowfall during these months.

(f) *North Waziristan.*—Snowfall was reported to be normal. At the end of April some accumulations were present on the highest peaks of Sheudar and Preghal.

#### IV.—KASHMIR.

(a) *Skardu.*—There was no snowfall at the station during the period. On the surrounding mountains, there were two light falls in March and a few light falls in April; no snowfall occurred in May. In March and April the snowline descended to about 9,000 ft. The accumulations on the higher passes were estimated to be about 6 ft. and 5 ft. at the end of March and April respectively. The little snow that was present at the end of May was rapidly melting away.

(b) *Dras.*—Snow fell on four days in March and two days in April. There were no falls in May. At Dras there was 2 ft. of snow at the end of March, and none by the end of April. The accumulations on Mushkoo hill were 9 ft., 6 ft., and 3 ft. respectively at the end of the three months. The falls and accumulations were below normal.

(c) *Srinagar.*—Several light to moderate falls of snow occurred on the surrounding mountains during March and April. There was no snowfall in May. The falls and accumulations were about normal in March and April and below normal in May.

(d) *Kargil.*—There was one very light snowfall in March and none in April or May. On the surrounding high peaks, the accumulations were about 5 ft. at the end of March, 2 ft. at the end of April and 1 ft. at the end of May. The falls and accumulations were below normal.

(e) *Sonamarg.*—Snow fell on nine days in March and on six days in April; no snowfall occurred in May. A few of the falls in March were heavy. On the surrounding mountains, the snowfall of the season was below normal. The accumulations at the end of each month are shown below and were below normal.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
Sonamarg (ground)	4	1	Nil.
Zoilila Pass	6	1½	1

(f) *Gurez*.—No information has been received for March and April. There was no snowfall in May. At the end of the month about 3 to 4 ft. of snow accumulations existed on Burzil pass, but the Tragbal pass was clear.

(g) *Leh*.—There were a few light falls of snow in each of the three months. The accumulations of snow on the higher passes at the end of each of the three months were 5 ft., 4 ft., and 3 ft. respectively and were normal. At the end of May, the snowline was at 14,000 ft. and some of the passes remained closed to traffic.

#### V.—THE PUNJAB.

(a) *Rawalpindi*.—Snow fell once in March to a depth of 1 inch and twice in April to a total depth of 5 inches. The snowfall for the season is reported to be below normal.

(b) *Chamba*.—In March, snowfall occurred on four days on the Pangri range to a total depth of 1½ ft. at Kilar, on three days on the Tissa range to depths ranging from ¾ ft. to 2¼ ft. at different elevations, and on one day on the Bhandal range. The falls were slightly above normal on the Tissa range and below normal elsewhere. No information is available for April. In May snow fell above 10,000 ft. on the Pangri range. The accumulations of snow at the end of May on the well-known passes and peaks were estimated to be 8 to 9 ft. and were about normal.

(c) *Kangra*.—Snow fell on the high ranges in the Kangra and Palampur tahsils and the Kulu sub-division up to average depths of 2 ft., 1½ ft. and 1 ft. respectively during each of the three months. The falls were generally normal in March and April and below normal in May. The accumulations at the end of each of the months March and April, given below, were normal. There were no accumulations at the end of May in these localities.

Locality.	March.	April.
	Ft.	Ft.
Awaru Pass	4	1
Sawai Pass	3	1
Sangaru Pass	2	1
Hampita Pass	6	2
Rohatang Pass	5	2
Rhabu Pass	3	1
Bishlen Pass	2	1
Jalori Pass	3	1

#### South-west Monsoon Period, June to September.

##### JUNE AND JULY.

#### I.—AFGHANISTAN.

*Kabul*.—There was no snowfall in Afghanistan during the period. Snow had practically cleared from the mountains, as usual, at the end of July.

#### II.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara*.—No reliable reports regarding snowfall during the period were received.

(b) *Dir, Swat and Chitral*.—*Drosh*.—There was no snowfall at Drosh during the period.

*Chitral*.—No snowfall was reported. The accumulations were thin and were confined to the high ranges. They were normal.

(d) *Kilba (Simla District)*.—There was one snowfall in each of the months March and April, the snowline descending to 5,600 ft. and 8,000 ft. respectively. In May, snow fell twice on elevations above 10,500 ft. All the well-known passes were closed to traffic during March and April, but at the end of May, all of them were open except for passage of pack animals. The falls and accumulations were below normal.

#### VI.—THE UNITED PROVINCES.

(a) *Almora*.—The following table gives the amounts of falls and accumulations for each month. The falls during the period and the accumulations at the end of May were above normal.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
<i>Falls.</i>			
Malla Danpur	5	4	3
Malla Darma	4	No report	1
Chaudans	11½	8½	2½
Byans	8	13	2½
Malla Johar	6½	Nil	1
<i>Accumulations.</i>			
Pindar Valley	42	45	45
Nandakhet	42	42	40
Sundar Dhunga	40	40	35
Bankafia	60	60	60
Mosurleg	25	20	15
Lipu	18	14	12
Lampia	12	21	18
Nuwe	25	No report	20

(b) *Garhwal*.—There were three snowfalls in March, two in April and four in May; the depth varied from 1" to 2" at lower levels, to 4 ft. at higher elevations in March and April, while, in May, the depth at higher altitudes was 1 ft. The snowline descended to 5,000 ft. in March, 3,000 ft. in April and 9,000 ft. in May.

The falls were slightly above normal in March and April and generally normal in May. At the end of May, there were slight accumulations of snow in the valleys, while, on the higher peaks, the accumulations were 1 to 2 ft. in depth.

*Malakand*.—No snowfall occurred during the period. The accumulations of snow on well-known passes and peaks were less than those of last year and about normal.

(c) *Khyber Agency*.—No snow fell during the period. There was no accumulation of snow at the end of July on the mountain range and passes.

(d) *Kurram*.—No snowfall occurred during the period. The approximate accumulations at the end of the period—Sikaram peak 4½", Badina peak 2½" and Zeran and Sikaram passes 1"—were normal.

(e) *South Waziristan*.—There was no snowfall during the period.

## III.—KASHMIR.

(a) *Skardu*.—No snowfall occurred at the station or in the adjacent mountain regions. At the end of July, the snow on the surrounding passes had practically melted away and no snow accumulation existed except on the mountain peaks above 13,000 ft. in height.

(b) *Dras*.—There was no snowfall. The accumulations at the end of the period were *nil*.

(c) *Srinagar*.—Two light falls of snow were observed on the surrounding high mountain peaks during June. The accumulations at the end of July were very thin and confined to the highest peaks and gorges of the surrounding mountains.

(d) *Gulmarg*.—Several light to moderate falls of snow which descended up to Khillanmarg were observed on the Affarwat and Handibal mountain range during June and two light falls on the higher peaks of the same range in July. The falls in June were reported to be above normal, while those in July were below normal. Thin layers of accumulation were reported to exist on the peaks of the mountain at the end of July.

(e) *Kargil*.—There was no snowfall during the period. The accumulations on the well-known mountains in the neighbourhood were about 6" at the end of June but only traces remained at the end of July.

(f) *Sonamarg*.—No snowfall occurred. At the end of July only traces of snow remained on the Zojilla and surrounding high mountains.

(g) *Leh*.—In June there were a few light falls on the distant peaks, the snowline remaining between 15,000 and 16,000 ft. There were no falls in July and the snowline receded to 18,000 ft. The falls were below normal. The accumulations on the high passes were about 3 ft. at the end of June and *nil* at the end of July.

## IV.—THE PUNJAB.

(a) *Chamba*.—There were two snowfalls in June above 10,000 ft. and one in July above 12,000 ft. The accumulations at the end of the period were reported to be below normal.

(b) *Kangra*.—There was no snowfall in the district except for light falls observed in early June above 11,000 ft. The snowline was above 15,000 ft. at the end of the period, and the accumulations were estimated to be below normal.

(c) *Kilba Hills*.—The few falls that occurred during the period were very light and were confined to elevations above 14,000 ft. All the passes were open for traffic. The falls were below normal while the accumulations were normal.

## V.—THE UNITED PROVINCES.

*Almora*.—The following table gives the aggregate falls during and accumulations of snow at the end of, June and July on the well-known passes and peaks. The falls were about normal while the accumulations were above normal.

Locality.	June.	July.
	Ft.	Ft.
<i>Falls.</i>		
Malla Danpur . . . . .	2	1
Malla Darma . . . . .	1½	½
Chaudans . . . . .	7	No report
Byans . . . . .	4	3
Malla Johar . . . . .	<i>Nil</i>	No report
<i>Accumulations.</i>		
Pindar Valley . . . . .	45	45
Nanda Khat . . . . .	42	40
Sundar Dhunza . . . . .	40	35
Bankatia . . . . .	60	60
Masurleg . . . . .	13	No report
Lipu . . . . .	9	9
Lampia . . . . .	13½	13
Nuwe . . . . .	20	15

*Garhwal*.—Several snowfalls were observed on the Trisul, Nanda Devi and other peaks above 20,000 ft. and the total amount was estimated to vary between 2 ft. and 6 ft. The accumulations at these elevations were estimated to be 5 to 6 ft.; they also extended to lower levels than usual.

## AUGUST AND SEPTEMBER.

No reports were received for Afghanistan and the North-West Frontier Province.

## I.—KASHMIR.

(a) *Skardu*.—There was no snowfall in August. In September, three light falls occurred on the surrounding high mountains and the snowline descended to 9,500 ft. The depth of snow on the higher passes was estimated to be a few inches at the end of September.

(b) *Dras*.—No snowfall was observed during the period.

(c) *Srinagar*.—A few light falls of snow were observed on the surrounding mountains in both the months. The falls were normal. Thin layers of snow existed on the higher peaks and gorges at the end of September.

(d) *Gulmarg*.—There was no snowfall in August. Several light to moderate falls of snow were observed on the surrounding Handibal and Affarwat ranges. The falls and accumulations were reported to be above normal.

(e) *Kargil*.—There was no snowfall during the period.

(f) *Sonamarg*.—No snowfall occurred in August. In September, snow fell on the surrounding high mountains and passes. The depth of snow on the Zojilla pass, at the end of September, was about four inches.

(g) *Leh*.—There were a few light falls of snow at elevations above 13,000 ft. in August. No snow fell in September and even passes at 18,000 ft. were free of snow at the end of the month.

## II.—THE PUNJAB.

*Kilba*.—There was no snowfall in August. During the first week of September snow fell on the higher peaks, the snow line descending to 10,500 ft. The falls were said to be above normal. All passes were open to traffic.

## III.—THE UNITED PROVINCES.

*Almora.*—The snowfalls and accumulations are given in the following table. The accumulations at the end of the period were above normal.

Locality.	August.	September.
<i>Falls.</i>	<i>Ft.</i>	<i>Ft.</i>
Malla Dampur . . . . .	1	2
Malla Darma . . . . .	1½	—
Chaudans . . . . .	6½	5½
Byans . . . . .	4½	10
Malla Johar . . . . .	Nd	—

Locality.	August.	September.
<i>Accumulations.</i>	<i>Ft.</i>	<i>Ft.</i>
Pindar Valley . . . . .	40	45
Nanda Khat . . . . .	40	45
Sundar Dhunga . . . . .	40	45
Bankatia . . . . .	60	65
Masurieg . . . . .	6½	5½
Lipu . . . . .	3½	8½
Lampia . . . . .	5½	12½
Nuwe . . . . .	15	—

*Garhwal.*—There was no snowfall during the period.

## The Retreating Monsoon Period, October to December.

## I.—AFGHANISTAN.

*Kabul.*—Light falls of snow were observed on the peaks of the Hindukush hills on one day in October, five days in November and three days in the first fortnight of December. In the second half of December snow fell on four days at Kabul to a total depth of 8 inches, which remained practically unmelted to the end of the month; in this period the falls were moderate on the hills and the Paghman and Hindu Kush ranges were thickly covered with snow at the end of the month. The falls and accumulations were reported to be above the average.

## II.—BALUCHISTAN.

*Quetta.*—Reports for the period ending 15th December indicate that there was a light snowfall on the important peaks on the 8th December.

## III.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—Reports for October and November were not received. The falls and accumulations for December are given below. These were above normal.

Locality.	Falls.	Accumulations.
	<i>Ft.</i>	<i>Ft.</i>
Thandiani . . . . .	8	1½
Birangali . . . . .	1½	½
Dungagali . . . . .	8	2
Kalabagh . . . . .	2½	1½
Narang . . . . .	7½	4
Pludran . . . . .	5	2½
Kagan . . . . .	4½	1
Jared . . . . .	½	—
Malkandi . . . . .	½	—
Suudi . . . . .	3	1½
Kund . . . . .	6	3½
Daeri . . . . .	4½	2½
Satu . . . . .	1½	½

(b) *Dir, Swat and Chitral.*—*Drosh.*—No reports were received for the period under report.

*Malakand.*—No reports were received for October and November. The falls and accumulations on the well-known peaks for December are given below:—

Locality.	Falls.	Accumulations.
	<i>Ft.</i>	<i>Ft.</i>
Lowarai . . . . .	2½	2
Bashkar . . . . .	3½	4
Mankial . . . . .	4½	6
Ilam and Dwa Sarai . . . . .	4	6
Hindu Rai . . . . .	5½	7

The falls and accumulations are said to have been below normal.

(c) *Kurram.*—There was no snowfall at Parachinar during December up to the 15th. Snow fell on the Sikaram, Badina, Kushkharan, Mundair and the other peaks of Safed Koh on five days in the first fortnight of December. The peaks were all clad with snow.

(d) *South Waziristan.*—On the 8th December, snow fell to a depth of one inch on the high hills of the Razmak district. Snowfall also occurred on the Marwati range, west of Wana on the 7th. Accumulations of snow existed at the middle of December on these ranges as well as on the Shawal hills.

## IV.—KASHMIR.

(a) *Skardu.*—No snowfall occurred at the station proper during October and November. But there were occasional snowfalls on the surrounding mountains during October, when the snowline descended to about 9,000 ft. The accumulations on the passes at the end of October and November were about one foot and 1½ ft. respectively. During December snow fell at the station on nine days to a total depth of 9 inches and on several days on the surrounding mountain ranges and passes. At the end of December the accumulations at the station were about 6 inches, while those on the surrounding passes were about 5 to 6 ft. deep. The falls during the month and the accumulations at the end of the period were both above normal.

(b) *Dras.*—Snow fell on two days in October, eight days in November and sixteen days during December. The Mushkoo hill was completely covered by snow during November and the Zojilla pass was closed to traffic. During December, the falls were so heavy that all the hills were covered with snow and the passes were all closed to traffic. At the end of December the accumulations of snow amounted



to about 4 ft. at Dras and to about eight feet on the Mushkoo hill. All the surrounding passes were closed. The falls during, and the accumulations at the end of the period were above normal.

(c) *Srinagar*.—Several light to moderate falls of snow were observed on the surrounding mountains during October. Six falls of snow, one to two feet in thickness on the aggregate, were observed on the surrounding Pirpanjal range in November and twelve falls amounting to three to four feet during December. At the station, two falls occurred in November and eight light falls during December. At the end of December, accumulations of three to twelve feet in thickness were reported on the surrounding mountains. All the passes were blocked for traffic, and telegraphic as well as telephonic communication was interrupted. The falls during, and the accumulations at the end, of the period were above normal.

(d) *Kargil*.—At the station there was no snowfall in October, and one light fall in November; in December snow fell on nine days and the snow melted measured 3".17. The falls on the surrounding mountains covered the peaks in November and amounted to 6 ft. in December. The accumulations at the end of December amounted to 1½ ft. at the station and to about 6 ft. on the neighbouring peaks. The falls during December and the accumulations at the end of the period were slightly above normal.

(e) *Sonamarg*.—There were four light snowfalls to a total depth of two inches in October. In November snow fell on ten days to a total depth of about 4 ft. In December snowfall occurred on seventeen days; some of the falls were heavy and the total amount was 10 ft. The accumulations at the end of the period were over 5 ft. at Sonamarg and about 9 ft. on the Zojilla pass. The falls and accumulations were above normal.

(f) *Leh*.—In October there was one light snowfall below 12,000 ft. and two falls above 13,000 ft. About 6" of snow accumulations existed on the high peaks and passes at the end of the month. In the month of November, snow fell on three occasions at the station and on several occasions on the hills to the north of the station. Snow had accumulated to a depth of about 3 ft. on neighbouring passes; but they were still passable. Reports received up to 15th December indicate that there was only one snowfall during December and that all the passes were open for traffic at the middle of the month.

(g) *Muzaffarabad*.—The only snowfall during the period occurred in November and was confined to the higher peaks.

#### V.—THE PUNJAB.

(a) *Chamba*.—No reports were received for October and November. There were three snowfalls in December, to a total depth of 2 ft. on the Bhandal Range, eight snowfalls to a total depth of 9 ft. on the Pangri Range, and four falls to a total depth of about 3 ft. on the Kalatop Range. No information is available about the accumulations on the first two ranges, but on the Kalatop Range 1½ ft. of snow existed at the end of December.

(b) *Kulu (Kangra District)*.—There was no snowfall in October. There was one snowfall in November to a depth of about 1 foot on the Hampta and Rohtang peaks. Information received up to the 12th of December shows that there was one snowfall in December the snowline descending to 7,000 ft., and that the accumulations on the peaks were as follows:—

Locality.	Accumulations.
	Ft.
Hampta Pass . . . . .	3
Rohtang Pass . . . . .	2½
Bashlev Pass . . . . .	2
Jalori Pass . . . . .	1½
Sirkhand Pass . . . . .	5

All the passes were closed to mule traffic.

(c) *Kilba (Simla district)*.—Snowfall during October and November was confined to the higher elevations, the snowline remaining at about 10,000 ft. The falls during these months were below normal. There were three snowfalls during December, the snowline descending to 6,600 ft. All the passes were closed to traffic at the end of the month. The falls during the month were above normal.

#### VI.—THE UNITED PROVINCES.

*Almora*.—The reports received show that the falls during the three months were slightly below normal. The accumulations at the end of December were about normal. The falls and accumulations as estimated by the patwaries are given below:—

Locality.	October.	November.	December.
	Ft.	Ft.	Ft.
<i>Falls.</i>			
Malla Danpur . . . . .	2	3	3
Malla Darma . . . . .	4	—	½
Chaudans . . . . .	—	1½	—
Byans . . . . .	3	4½	2
Malla Johar . . . . .	—	—	½
<i>Accumulations.</i>			
Pindar Valley . . . . .	47	50	53
Nandakhat . . . . .	47	50	53
Sundar Dhunga . . . . .	47	50	53
Bankatia . . . . .	65	67	70
Masurleg . . . . .	—	15	15
Lipu . . . . .	4	3	40
Lampia . . . . .	6	4½	60
Nawe . . . . .	21	25	25

*Garhwal*.—There was no snowfall in October. There were four snowfalls during November and the snowline descended to 10,000 ft., the depth of snow on the higher altitudes being 6". In the month of December, there were four snowfalls and the snowline descended to 5,000 ft. The depth of snow on the higher altitudes was about 2½ ft.

### Summary.

*Cold weather Period, January and February.*—Both snowfall during the period and the accumulations at the end of the period were below normal in the hills of Afghanistan and Baluchistan, normal in the North-West Frontier Province, Kashmir and the Punjab and above normal in the Eastern Himalayas.

*Hot weather Period, March to May.*—There was practically no snowfall in Afghanistan and Baluchistan during the period. Falls and accumulations were generally below normal in the North-West Frontier Province, Kashmir and the Punjab, and above normal in the United Provinces.

*South-west Monsoon Period, June and July.*—No snow fell in the hills of Afghanistan, Baluchistan and the North-West Frontier Province while a few falls occurred at higher eleva-

tions in Kashmir and the Punjab. Several falls were reported from the United Provinces hills at very high levels. The accumulations were generally normal except in Almora and Garhwal where they were above average.

*South-west Monsoon Period, August and September.*—Falls and accumulations were generally normal in Kashmir and the Punjab, and above normal in the United Provinces. Reports from other regions were not received.

*Retreating Monsoon Period, October to December.*—Snowfall was above normal in Afghanistan, Kashmir and Assam, normal in Baluchistan, the North-West Frontier Province and the Punjab and below normal in the United Provinces. Accumulations were above normal in Afghanistan, Kashmir and Assam and generally normal elsewhere.